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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,388	01/15/2004	Takeshi Kobayashi	61282-055	4950

⁷⁵⁹⁰
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EXAMINER

NGUYEN, DILINH P

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2893

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09/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/757,388	Applicant(s) KOBAYASHI ET AL.	
	Examiner DILINH P. NGUYEN	Art Unit 2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 19-26, 32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) 4, 6-10 and 21-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 19, 20, 32 and 33 is/are rejected.
- 7) ☒ Claim(s) 2, 3 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/2/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

The previous rejection has been withdrawn. However, in view of further consideration/search the new rejection has been made.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the first conductor layer covers an entire inner wall of the groove portion (claim 3) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

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the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1-2, 19 are objected to because of the following informalities:

Line 9, claim 1, replace “the first conductor layer” with –a first conductor layer--.

Lines 1-2, claim 2, replace “a first conductor layer” with –the first conductor layer --.

Line 6, claim 19, replace “the first conductor layer” with –a first conductor layer--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 19-20 and 32-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (U.S. Pat. 6441502).

Yamada et al. disclose a semiconductor device (fig. 10C) comprising:

a semiconductor chip 31;

a multi-layer lead connection 58 (fig. 10C, column 7, lines 30-33), wherein a portion of the reverse face of the multi-layer lead protrudes from a principal plane of the piece of sealing resin 37, the first conductor layer (an outer most layer of multi-layer

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lead connection 58) (fig. 10C, column 7, lines 30-33) covering an entire surface of the portion and including a part within an enclosed groove of the piece of sealing resin 37, wherein the multi-layer lead 58 contacts a surface of the semiconductor chip 31 (fig. 10C).

Regarding claim 20, Yamada et al. disclose that the multi-layer lead 58 further including: a second conductor layer laminated inside the first conductor layer; and a third conductor layer formed inside the second conductor layer (fig. 10C, column 7, lines 30-33).

Regarding claim 32, Yamada et al. disclose that wherein a surface of the first conductor layer (the outer most layer of multi-layer lead connection 58) (fig. 10C, column 7, lines 30-33) facing away from the semiconductor chip 31 is uncovered (fig. 10C).

Regarding claim 33, Yamada et al. disclose that wherein the multi-layer lead 58 is in direct contact with a surface of the semiconductor chip 31 (fig. 10C).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ooyama et al. (U.S. Pat. 6191494) in view of Yoneda et al. (U.S. Pat. 6072239).

Ooyama et al. disclose a lead frame comprising:

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a lead frame body 31 (copper) (fig. 5A, column 6, lines 1-3) comprising a sheet shaped body made of metal;

a groove portion 33a or 33b (fig. 5B) for forming a lead which is formed by a predetermined depth in a lead forming a region on a surface of the lead frame body; and

a lead 28a and 28b (fig. 6, column 7, lines 15-20) having a portion with protrudes from the groove portion laterally onto the surface of the lead frame body so as to be in contact with the surface, the lead being made of material different from material of the lead frame body,

wherein the lead includes a barrier layer 28b-1 (Ni) (fig. 6, column 7, line 17) for suppressing a reaction between the lead frame body (copper) and a first conductor layer 28b-2, the barrier layer being provided on a part of the groove portion so as to be in contact with the lead frame body in the groove portion, and

wherein the barrier layer 28b-1 is made of nickel (fig. 6, column 7, line 17).

Ooyama et al. do not explicitly disclose the lead completely filling the groove portion.

However, Yoneda et al. disclose a lead frame comprising: a lead frame body 121 comprising a sheet shaped body made of metal (Cu) (fig. 76, column 20, lines 42-44); a lead (layers 155 and 171) (fig. 79), wherein the lead completely filling the groove portion (fig. 79).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Ooyama et al. by having the

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lead completely filling the groove portion, as taught by Yoneda et al., in order to improve the reliability of the semiconductor package.

Allowable Subject Matter

Claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to disclose the combination of a semiconductor device structure recited in the base claim 1, including the combination of the structure comprising: the first conductor layer formed in the groove portion; a second conductive layer formed on the first conductor layer; and a third conductor layer formed on the second conductor layer, wherein the first conductor layer is assembled to an assembling member, and the third conductor layer is assembled to a die pad of a semiconductor chip.

Response to Arguments

Applicant's arguments filed 3/31/08 have been fully considered but they are not persuasive.

The applicant argues that Yoneda and Ooyama, taken alone or in combination with one another, fails to disclose a barrier layer for suppressing a reaction between the lead frame body and a first conductor layer, the barrier layer being provided on a part of the groove portion so as to be in contact with the lead frame body in the groove portion, and

wherein the barrier layer is made of nickel.

Applicant's arguments have been fully considered but they are not persuasive because Ooyama et al. disclose a lead frame comprising: a barrier layer 28b-1 (Ni) (fig. 6, column 7, line 17) for suppressing a reaction between the lead frame body (copper) and a first conductor layer 28b-2, the barrier layer being provided on a part of the groove portion so as to be in contact with the lead frame body in the groove portion, and

wherein the barrier layer 28b-1 is made of nickel (fig. 6, column 7, line 17). Thus, Ooyama in view of Yoneda disclose all the limitations as required by claim 1.

Applicant's arguments with respect to claims 19-20 and 32-33 have been considered but are moot in view of the new ground(s) of rejection. See the new ground of rejection above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DILINH P. NGUYEN whose telephone number is (571) 272-1712. The examiner can normally be reached on 9:00 AM - 6:30 PM (Monday-Thursday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571) 272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DLN

9/15/08

/(Vikki) Hoa B Trinh/

Examiner, Art Unit 2893